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ABSTRACT

Two representative samples of expository prose from sixth grade textbooks (one in science and one in social studies) were analyzed for clarity of explanation. Four text criteria were applied to the analyses: structure, unity, coherence, and audience appropriateness. The results of the analysis suggested that many children's textbooks are not clearly written. It was proposed that the procedures commonly used by authors to make texts easier to read (shorter sentences, easier vocabulary, less detail, and use of condensed explanations of ideas) may instead cause the text to be even more difficult to comprehend. The effect of poor quality text on how well children learn to read and comprehend text may also be very great. A third suggestion, based on these research results, is that poorly written texts may develop undesirable student attitudes toward reading texts. To combat these possible effects of poorly written texts, it was proposed that editors and publishers monitor textbook production more carefully, that teachers evaluate texts carefully and help students develop textbook reading skills, and that authors of textbooks pay closer attention to structure, coherence, unity, and audience appropriateness. (The response of one of the publishers of the textbooks that were evaluated is attached and is followed by comments from the editor of this report series.) (RL)

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Reading Education Report No. 16

HOW CLEARLY WRITTEN ARE CHILDREN'S TEXTBOOKS?
OR, OF BLADDERWORTS AND ALFA

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Foreword

In this document we report a critique of two expository passages taken from children's textbooks. This critique focuses on how clearly written we think they are. An earlier version of the critique was sent to a representative from each of the two companies that published the texts. One publisher declined to respond. The other did respond and that letter follows our critique in this document. The last section, prepared by the editor of the Reading Education Report series, elaborates some of the important issues that surfaced during the transactions of putting this report together. We think it is important for the reader to attend carefully to the main body of this paper, the publisher's response, and the editor's Afterword in sequence.

Several of our reviewers have asked us: Why did we prepare such a document? Were we out to "get" a specific publishing company, editor, or author? Our answer to all of these questions is No! However, we were (and still are) committed to eliminating what we perceive to be poorly written prose from children's textbooks.

That we had a mission, and that our mission was informally supported by many of our colleagues, encouraged us to prepare such a document. Our missionary zeal evidently led us to use emotionally loaded terms in an earlier version of our document. That upset some people more than we intended. Consequently, we have tried to remove the loaded language. Otherwise, our main thesis remains intact for your consideration.

It would be unfair (and perhaps unethical) for competitors of the publishing companies in question to use information from this report in an attempt to gain any sales advantage. We think that we could have illustrated our points using the textbook of almost any publishing company. In addition, we think that it would be unfair, based on our critique of small samples of text, to judge the quality of the curriculum packages represented by these two textbooks. This is especially true when considering the fact that in some curriculum programs the students' textbooks, by design, play a minor role in the total scope of instruction. Our choice of small samples was dictated by time, space, and efficiency concerns in that we selected certain segments because they enabled us to illustrate efficiently the points we were trying to make. We do not wish to imply that the rest of the text shares the identical weaknesses.

Abstract

Two representative samples of expository prose from sixth-grade textbooks (one in science and one in social studies) were analyzed for clarity of explanation. The authors applied four text criteria to the analysis: structure, unity, coherence, and audience appropriateness. The results of the analysis suggest that expository text in children's textbooks is sometimes not very clearly written. Some hypotheses are suggested about the effects of poorly written text on knowledge acquisition, the development of reading competencies, and the development of the attitude that text is a legitimate source of information. Also, several recommendations about how to overcome the suspected problem are made.

How Clearly Written are Children's Textbooks?

or

Of Bladderworts and Alfa

We raise the question, How clearly written are children's textbooks?, because we suspect that many are not written very well. We introduce our proposition as a question rather than as an assertion because we have not as yet applied all of the available analytical tools to the texts we have considered. Nor have we sampled systematically a scientifically acceptable number of texts, a procedure that would enable us to provide an estimate of how widespread this situation is. But our overriding impression is that in their elementary school years, students read many pages of unclear text. The main purposes of this paper are to illustrate what we mean by "unclear text" and to make some recommendations for improving the texts children read in school.

Text Analysis Procedures

When we refer to text, we mean that part of a student's textbook in which the student reads formal prose and is expected to learn some new ideas from the prose. Although textbooks have a variety of sections, such as glossaries, pictures, charts, and maps, we are interested primarily in the prose sections that constitute the greatest percentage of the textbooks.

Also, we are assuming that textbooks have to be written in such a way that students who have minimum background knowledge about the topic of the text can read it and comprehend the information that is there.

For the conscientious but poorly informed student, reading to comprehend requires a strategy whereby the relationships between an idea being read and those previously read can be established. When these relationships are stated vaguely or ambiguously in the text, the student may fail to make much sense of the text at all. Of course, mature readers who have ample knowledge of the topic can rely heavily on inferencing strategies to help overcome vaguely and/or ambiguously stated relationships. In our work here, we have attempted to analyze text from the perspective of a typical sixth-grade reader who does not have well-developed inferencing strategies.

In addition to taking the perspective of a sixth-grade reader, we looked at the text from the point of view of a rhetoric critic. As a rhetoric critic, we gauged how unclear the text was by grouping our observations into four categories based on some of the traditional rhetorical properties of expository text: structure, coherence, unity, and audience appropriateness. Structure concerns the ordering of ideas in a written piece and is largely determined by the pattern of organization that the purpose of the piece requires. Some typical purposes are: to explain cause and effect, to compare and contrast, to describe the main features, to tell how something works or how to do something, to explain a problem and its solution, and to explain when something happened.

Coherence concerns how well the sentences and ideas are woven together and flow into each other. When coherence is present, the reader can move easily from one idea to the next and is more likely to read the piece as

an integrated whole, and not as a collection of separate sentences. The reader is likely to experience difficulty if pronoun references are unclear, or transition words, sentences, and paragraphs are missing or inappropriate.

Unity in a written piece is the internal consistency of ideas. Anything that does not advance the purpose of the piece can potentially destroy its unity. Common examples of text features which destroy unity are trivial details, misleading facts, contradiction of facts, and excessive repetition.

Finally, audience appropriateness is a relative concept which depends a lot on the reader. If an idea is explained adequately to a reader, then the text is said to be appropriate. If the text contains too much explanation, the reader may become bored; if too little, not much will be learned. In addition to the amount of explanation, the vocabulary load, syntactic complexity, and amount of the reader's background knowledge are crucial to appropriateness. There must be an adequate match between what the student knows before reading and what the author chooses to write down.

In addition to evaluating these qualities of structure, coherence, unity, and audience appropriateness in the texts we looked at, we have tried to evaluate how these passages fit into the content area and educational contexts. For example, we reviewed the scope of ideas in each of the textbooks we sampled to get a feeling for the background knowledge that the author intended for the student to have when reading a specific piece. To do this, we used information from the tables of contents and the teaching plans in the teachers' editions of the textbooks as well as the texts

themselves. These steps were taken to help guard against the possibility of suggesting that a piece of prose is unclear when there is information elsewhere in the text that could be used to clarify it.

An Analysis of Two Text Segments

In this section, we present analysis results from two types of content area texts. One is a natural science and the other a social studies text. The presentation style we have used in the two units differs widely. We could have edited our analyses into a more homogeneous format, but we are content to let you experience some of the diversity of our observations. We chose to analyze two medium-length texts rather than engage in a sampling routine including many shorter texts. In addition, we chose texts from a region judged to be somewhere near the middle of our hypothetical text quality continuum. In other words, we found many passages that were worse than these. We decided to choose text from major textbook publishers, and not from the smaller ones who often slant their textbook design toward special groups of students or content area perspectives. Our analysis includes excerpts from a science chapter from the Ginn Science Series (Bendick & Gallant, 1980, pp. 47-95), and a social studies chapter from the Macmillan Company Social Studies series (Lefferts & Soifer, 1978, pp. 492-519) intended for sixth graders.

Science Chapter: "Food for the World"

Our discussion of the natural science textbook chapter is organized as follows: (a) An overview of the entire chapter establishes context and

presents major confusions that readers are likely to encounter in moving among sections of the chapter. (b) An overview of a short excerpt presents potential comprehension problems within a particular eight-paragraph section. (c) A detailed discussion presents an analysis of the text within the eight-paragraph excerpt.

Chapter overview. The greatest problems with the chapter as a whole pertain to structure and unity. With respect to structure, it is difficult to infer the overall purpose of the chapter--the major understandings that a student might be expected to have upon completion of "Food for the World." Hypotheses about purposes change within and between sections. Closely related to the structural problem is the lack of unity--the great range in content and the tendency for topics to change with no apparent rationale. The lack of structure and unity is conveyed in Table 1, which presents the subtitles of the chapter and the major ideas of each section (as given in the teacher's edition).

Insert Table 1 about here.

The unit begins with a two-page section called "Plants are Important" (see 1 in Table 1)--a terse overview about the making of food by green plants, the different parts of plants, and the transportation of sugar, water, and minerals through the plant. Only a small part of the section actually relates to the importance of plants. In the middle of the section is the statement, "To understand how a whole plant works, it sometimes

helps to find out how one part of the plant works. This unit will give you a close look at how leaves work. You will also find out how leaves are related to other parts of the plant" (p. 49). This overview of the unit does not seem to match the title, "Food for the World" since no mention is made of food or of the world. The student may be confused by the apparent inconsistency between the title and the overview statement. We assume that the student will continue reading with either the expectation that the unit will be about "Food for the World" or about "How Leaves Work." If the student assumes that the unit is about "Food for the World," he or she may expect the next section to begin saying something about food. If the student assumes that the unit is about "How Leaves Work," he may expect the next section to begin the explanation of the workings of leaves. But neither of these potential expectations is fulfilled. The next section, called "Kinds of Leaves" (II), describes the similarities and differences of many kinds of leaves.

The following section is "Plants that 'Eat' Animals" (III). Students may be confused because the thesis of this subsection contradicts a summary statement presented earlier that "The roots of the plant take up water and minerals from the ground and supply these minerals to the rest of the plant." The student is now confronted with a five-page discussion of an atypical process of obtaining minerals from leaves before receiving a solid foundation in the typical process. Furthermore, the student who assumes that the unit is on "Food for the World" may wonder why the first food to be discussed is the diet of Venus flytraps.

After proceeding through bladderworts (a type of swamp plant that "eats" animals), the student gets to a section entitled "How Leaves Make Sugar" (IV). Expectations of an explanation about how leaves make sugar are not realized, as the section begins with a lengthy description of an early botany experiment. Only after seven paragraphs does the student read,

By the early 1800's, scientists knew that carbon dioxide was taken in by the leaves of green plants. They also knew that the energy of sunlight in some way joined the carbon dioxide with water in the leaves. In this way, green plants make the sugar called glucose." (p. 161)

So much for "How Leaves Make Sugar." Also within this section, a subsection entitled "A Look Inside a Leaf" describes the structure of a leaf.

The next two sections, "How Green Plants Get Energy" (V) and "How Green Plants Use Their Energy" (VI), finally tell more about how leaves make sugar and expand some of the vague ideas in the overview presented about 15 pages earlier--specifically, the processes of photosynthesis, respiration, and transpiration. The order of presentation of information appears reasonable, except that (a) "Setting the Pace of Photosynthesis" is presented in the section "How Green Plants Use Their Energy" rather than in the section about photosynthesis, and (b) "How Leaves Save Water" (transpiration) is subsumed under "How Green Plants Use Their Energy" (respiration). (We will return for a more detailed analysis of two pages of this subsection.)

Once past "The Pace of Transpiration," the student comes to a five-page section on "How Leaves Change Color" (VII). The student is likely to be puzzled about the precipitous shift from the immediately preceding topic. Also, the student who expects the unit to be about "Food for the World" may wonder why a section on autumn color change is included.

Then comes "What Makes Leaves Fall," and on to the section "Plants to Feed the World" (VIII)--finally something that sounds like it belongs with the chapter title. However, the author does not begin talking about plants at all, but rather about population and the population explosion. The topic changes to a little history of starvation, then to some basic facts of nutrition (including calories and minimum daily requirements), then to a comparison between industrialized, well-fed America and non-industrialized starving nations. A subsection entitled "Plants Have Helped Us" explains some reasons for America's nutritional status in terms of improved crop production. The next subsection, "Who Can Feed the World?," attempts to explain why the starving nations are starving. The final subsection, "What Happens Next?," poses the problem of more population and less food production.

Now that we have conveyed a sense of the seemingly disjoint ideas from botany, nutrition, and ecology in the chapter as a whole, we turn to a closer look at the section "How Leaves Save Water." First, the material presented before the segment of interest will be summarized. Then an overview of major problems in an eight-paragraph

excerpt will be presented. Finally, the eight-paragraph excerpt will be discussed in detail.

Summary of content preceding excerpt from "How Leaves Save Water." The subsection begins with a summary statement that water flows from the roots to the leaves, where it evaporates as water vapor and flows out of the leaves through leaf openings. The water loss is defined as transpiration. After reading this introductory paragraph, students are encouraged to conduct an investigation to observe transpiration by putting plastic bags over leaves and observing the collection of moisture inside the bags under varying conditions. The next paragraph of text gives examples of number of gallons of water lost through the leaves. The following paragraph repeats the introductory paragraph by giving a more detailed summary of how water passes through the plant and then evaporates from the leaves. The text goes on to describe the guard cells of leaves and their function in controlling the stomata. (The leaf openings are first labeled as stomata in this section, although leaf openings were discussed seven pages earlier in the subsection "A Look Inside a Leaf.") The next two paragraphs of "How Leaves Save Water" suggest that the role of leaf openings is to make possible the passage of gases involved in photosynthesis and respiration. The only gas mentioned specifically is carbon dioxide. This summary brings us to the eight-paragraph excerpt we analyzed in detail.

Overview of potential comprehension problems in excerpts from "How Leaves Save Water." Table 2 presents the target text, with sentences numbered for easy reference. The reader is encouraged to read the text carefully before proceeding with the discussion.

Insert Table 2 about here.

The major problems with the text in Table 2 are related to structure. At the most global level, the author has obscured main ideas by devoting relatively little attention to them and by placing them after less important information. Another striking structural problem is the inclusion of a poorly organized explanation, in which important premises are missing and competing hypotheses are not adequately refuted. Finally, the excerpt uses confusing temporal organization to describe a process.

The excerpt leaves something to be desired with respect to unity, also. Much of the segment does not seem to advance the author's purpose as implied by the title of the subsection. Presumably the author's real purpose is to explain the primary function of guard cells and stomata, but since the author spends more time dismissing an alternative function of these cells, the reader does not come away with a unified, tight explanation. Furthermore, the final paragraph shifts abruptly from an explanation of the function of stomata to the location of stomata on a leaf. A sophisticated, informed reader could infer the connection and impose some unity with the preceding

explanation, but the naive reader will probably find the last paragraph irrelevant. Another problem related to unity is the presence of contradictory information. For example, students were led to believe in one section that the stomata were only located on the lower leaf surface; later in the text they were told that only some plants have stomata solely on the lower surface.

One way in which coherence poses a problem in the excerpt is that the author uses some connectives or transitional markers in a confusing or misleading way. For example, a but in the passage implies a contrast or contradiction that never materializes, and a then is used to indicate a conclusion that apparently should be obvious but was never really established. In addition, the author omits some causal connectives that are important to the flow of an explanation.

Audience appropriateness is lacking in that the author does not provide sufficient information to enable informed adults--much less sixth graders--to comprehend the crucial explanation. In other places, information necessary to critical inferences is presented in the text, but sixth graders probably cannot make the inferences without a reminder or review of the information.

These claims are strong ones. We present evidence to support them in the following detailed analysis of the excerpt. Some readers may want to pursue the discussion; others may "get the picture" and prefer to skip to the discussion of the social studies chapter beginning on page 18.

Detailed analysis of potential comprehension problems in excerpt from "How Leaves Save Water." The first paragraph of the target segment is apparently designed to invite an inference about the reason for the opening and closing of the leaf openings. The last two sentences are confusing. Beginning with so, Sentence 4 suggests that one 'might think' on the basis of the previous three sentences that the opening and closing of the stomata are related to photosynthesis. The next sentence is, "But is it?" Because but signals a contrast, the implication of the two sentences is something like, "You might think that the opening and closing is in some way linked with photosynthesis, but you'd be wrong." Thus, the reader has been set up for a paragraph explaining that, despite a reasonable hypothesis about photosynthesis, the opening and closing of the stomata are really a function of some other factor.

As it turns out, the implication from the next two paragraphs is that the opening and closing of the stomata is related to photosynthesis (as well as respiration). Unfortunately, sixth graders will probably have difficulty drawing this conclusion, not only because they may be expecting a different conclusion but also because they may not be able to follow the explanation.

The explanation is likely to be confusing if students do not remember the prerequisite information about the processes of photosynthesis and respiration (presented six and four pages earlier, respectively) and the information about the structure of leaves (presented eight pages earlier),

For example, students may not understand Sentence 9 if they have forgotten the process of photosynthesis. If students are shaky on photosynthesis and respiration, they may not find the text coherent; that is, they may not be able to infer important connectives that are not explicit in the text. For example, comprehension of the third paragraph requires the inference of causal connectives (e.g., therefore, as a result) between Sentences 13 and 14, Sentences 15 and 16, and Sentences 17 and 18.

Following the cyclical time relationships in Paragraphs II and III may also prove difficult for students who are not experts in photosynthesis and respiration. Sentences 7 and 8 jump backward in the sequence. If the students remember enough about photosynthesis, they may be able to infer that Sentence 9 returns to morning and picks up the sequence again. Sixth graders may not realize when they get to Sentences 15 and 16 that they have returned to the situation described in Sentences 7 and 8. The paragraphs lack a topic sentence that might lend coherence to the text and help students understand the explanation.

So far, the subsection apparently has nothing to do with the title "How Leaves Save Water." Finally, the eleventh and twelfth paragraphs of the section (the fourth and fifth of the target segment) seem to be the major source of information about "How Leaves Save Water," but the student is not told so in a topic sentence. It requires almost an "Aha!" insight after reading these paragraphs for the reader to realize that he or she has finally been told how leaves "save" water. Of course, sixth graders may

never have this "Aha!" experience, since "saving" water is not mentioned; only "losing" water. Students may be confused by the concepts of "saving" and "losing" water, since these words are used in a different way than most sixth graders have probably used them. To sixth graders, "saving" probably means either "rescuing" or "putting away excess amounts" rather than the intended sense in the text of "maintaining an adequate amount." "Losing" probably means "to come to be without, by some chance, and not know the whereabouts of" (The American College Dictionary, 1964) to sixth graders rather than the sense intended in the target text segment.

The sixth paragraph establishes the logical chain of events resulting from closed stomata. If students remember enough about photosynthesis and respiration, this paragraph should pose no major obstacles to comprehension.

The first sentence of paragraph VII, however, seems almost a non sequitur. The use of the word then signals a logical conclusion from established premises. We were not able to follow the line of reasoning to the conclusion that regulating water loss is the chief role played by stomata, and we suspect that sixth graders will also have difficulty.

Not only will students probably fail to understand the explanation behind Sentence 34, but they may also fail to realize that it is apparently the 'main idea' of a considerable chunk of text. (In the teacher's edition, Sentence 34 is indicated as a main idea by blue underlining; in fact, this is the only underlined sentence in the target segment.) Sixth graders are likely to miss this main point because they have probably learned that authors usually give relatively greater coverage to more

important ideas than to less important ones and that the more important information is presented before the less important information. In this passage, however, the more important information receives less coverage than the less important information, and the more important information is presented after the less important information.

The next three sentences in paragraph VII present another argument that may stump most sixth graders. Sentence 36 begins as if the reader might be thinking that the main job of leaf openings is to speed up or slow down photosynthesis. It is very unlikely that the sixth-grade reader would make such an assumption. The reader has previously read that there is some indirect relationship between photosynthesis and leaf openings/closings, but no mention was made of the relevance of the pace (speeding up/slowing down) of photosynthesis. Furthermore, it is difficult to see how the consequent of the conditional statement follows the antecedent: How is the fact that leaf openings are closed at night logically inconsistent with their possible role in controlling the pace of photosynthesis during the day? Finally, quite a lot of information is left to be inferred between Sentences 36 and 37. The author is apparently trying to argue that the relationship between leaf openings and photosynthesis is relatively unimportant and that the crucial function of leaf openings is to "save water." He has tried (we feel unsuccessfully) to present evidence against the "photosynthesis hypothesis," but he has presented no evidence for the "saving water hypothesis." We find it especially disturbing that students are exposed to such poorly structured and executed explanations in a

science curriculum, where instead, they should be learning from flawless models of deductive reasoning and logical argumentation.

The final paragraph of the target segment shifts the topic to the location of leaf openings. The information in this paragraph contradicts information presented nine pages earlier, in the section entitled "A Look Inside a Leaf." In the earlier section, the student was led to believe that the upper surface of the leaf consists of a (presumably unbroken) layer of thin, tough cells; openings were only mentioned with respect to the lower leaf surface. Now students are being told that only some plants have stomata solely on the lower surface; most green plants have some on the upper surface as well. The paragraph ends with a question that sixth graders will almost certainly be unable to answer on the basis of information presented in the text. The teacher's edition states that one answer might be that there is less evaporation and water loss from the under surface of the leaf. Such an answer requires knowledge and sophisticated reasoning that is probably beyond the ability of most sixth graders, and certainly beyond the ability of those students whose only source of information about plants has been the text.

Concluding remarks about the chapter "Food for the World." Assuming that the text in Table 2 is a representative sample and that our analysis is reasonable, one is forced to the conclusion that sixth graders may be confused more than informed by the texts they are expected to read independently. The misrepresentation of content by titles and subtitles

(violations of the unity criterion); the obscurity of main ideas; the omission of crucial information; the lack of coherence of ideas between and within sections, paragraphs, and sentences; the presence of contradictory information; and the logical inconsistencies and ambiguities found in the structure of explanations are likely to perplex and frustrate students. Even if students apply well-honed reading and studying skills to such texts, it is questionable whether they could comprehend what they read without close supervision and frequent sentence-by-sentence interpretation by a teacher. Unfortunately, most of the recommendations in the teacher's guide are activities "designed to complement, reinforce, and extend the basic story line" rather than activities aimed at helping students read and understand the "basic story line" itself.

Now, on to a social studies text.

An Overview of A Social Studies Textbook Entitled "The Old World"

There are seventeen units or chapters in the textbook (see Table 3). The first two units introduce basic social studies skills and concepts and

Insert Table 3 about here.

describe the prehistory of man. With the exception of Unit 7 on life in the Middle Ages, the rest of the book is organized around major geographical areas, sometimes around a specific country (for example, Unit 9 on "The Republic of France"), and sometimes around a whole continent (as in Unit 17 on Africa). Within most units can be found subheadings such as: climate

of country X; products of country X, people of country X, industry in country X; the city Y of country X; the government of country X; country X under the rule of country Y; the early history of country X; the problems of country X. Where these subheadings occur, a reader can discover a fair amount of specific information about a country or region. The subheadings serve to guide the reader through the various concepts presented in the units.

An overview of a social studies unit entitled "The Continent of Africa."

This is the last unit in the book, and information about more than 25 countries is presented (see Table 4). Some information about Africa as

Insert Table 4 about here.

a whole is given, for example "the exploration of Africa" in section 1 and "the needs of Africa" in section 5. Other general information, like geography of an area, is presented at the beginning of the sections on North Africa, Central Africa, and Southern Africa. Most of the chapter, with the exception of the discussion of the Republic of South Africa, consists of short text segments (from one to ten paragraphs) about individual countries.

The teacher's edition of the book makes it clear that the students are expected to understand that most African countries have had similar pasts and face similar problems. Table 5 is the teacher's edition's list of major understandings, skills to be stressed, and attitudes for special emphasis which should be gained from the unit. We have underlined those

items which apply to all African nations, and we have put asterisks by those items that are especially relevant to the passage on Algeria, which will be the object of our closest analysis.

Insert Table 5 about here.

It is also clear from the lesson plan in the teacher's guide that the information in the chapter is to be integrated with previously studied units. Here are two quotes that are relevant:

1. Begin by asking the children to recall what they learned about Africa in earlier units. Some may tell about the ancient civilization in Egypt, others will remember Carthage and the Roman settlements in the north. People of many cultures inhabited North Africa during various periods. Some children may mention the Moorish Conquest of Spain and the lasting impression left on the Iberian Peninsula. (p. 74)
2. Africa is rapidly changing. The children may discuss the emergence of independent states by referring to the chart "Nations of Africa," on page 516. They will find that until 1946 most of the continent was controlled by Europeans. Discuss why Europe raced to Africa to secure colonies. (Raw materials, markets for manufactured goods, coaling stations.) Tell them that in this unit they will learn how the new, independent nations are realizing their potential economic growth. (p. 74)

Thus far, we have looked at the goals and expectations of the publishers. We will assume that the teacher will have followed the teacher's edition, and will have informed the students about the general concepts to be learned.

In addition to the suggested material in the lesson plan of the teacher's edition, the sixth-grade reader can be expected to know some other information about Africa in general and Algeria in particular as a result of reading the text preceding the section on Algeria.

By the time the Algeria passage is encountered, we know (and the sixth-grade reader may know) something about the geography and climate of Northwest Africa, the Sahara Desert and Atlas Mountains, the potential petroleum industry, the fact that the Arabs swept across Northern Africa after the fall of Rome, and the fact that the Moors invaded Iberia from North Africa. The student may know from the text that European nations set up colonies in Africa because of their abundant natural resources and that the scramble for colonies began "suddenly" about 1870. The teacher may have explained the suddenness as a result of factors present during the end of the Industrial Revolution. Further, the student might know that European nations gave up their colonies because they were unable to afford them. (Although there is a fairly nice discussion of the reasons why Britain gave up its colonies and why these colonies demanded independence, the discussion is back 175 pages in the unit on England. It is specific to British colonies, and there is no cross reference to it in the unit on Africa.)

A detailed look at "Algeria, Past and Present." We want to take you on a tour of "Algeria, past and present" through the eyes and mind of a sincere sixth-grade student who is motivated to read and learn about Africa. Before reading our version of a sixth grader's thoughts, read the text

presented in Table 6 and pay particular attention to your own thoughts as you read the section.

Insert Table 6 about here.

Now let's go through step by step.

PARAGRAPH I. (page 498)

1. Algeria is a Mediterranean land.
Yep, it is. I see that on the map. Let's see, I also know that the Mediterranean land has a temperate climate.
2. Most of the people of Algeria are Berbers.
Mmm, what's a Berber? I've never heard of that before. Is this a tribe like the Zulus or Pygmies?

PARAGRAPH II.

3. In early times the people of North Africa were often at war with Christians on the other side of the Mediterranean Sea.
OK, this is a new paragraph. It's marking the beginning of a new main idea. The title of this part is "Algeria, past and present." This must be the past, because it's early times. Now let's see, did I already know that the people of North Africa were often at war with the Christians? Let's see, early times. Oh yeah, like when we learned about the war between Carthage and Rome. Wait a minute, there weren't any Christians then. So when is early times? Oh, maybe they mean the Moors. They conquered Spain around 711. Let me go back and see. Here it is. Page 250. "The Moors lived in Spain for more than eight hundred years. But the Christian armies waged constant war upon them. The Christians gradually took over the peninsula." Yeah, and the Moors were kicked out in 1492. Hmm, so that's what "early times" means, between 711 and 1492.

4. The North African lands were known as the Barbary States.

*Does this have something to do with the Christians and the wars?
Or maybe this means that in early times the lands were called the
Barbary States. I wonder why they were called States. Is it like
the United States? Why are they telling me this?*

5. In the 1700's and early 1800's the Barbary States were the home of pirates who seized ships, kept the cargoes, and sold the passengers and crew as slaves.

*Wow, those were mean people. . . . Wait a minute, there's still
something else here. I'm still in the same paragraph. So that
must mean something. Sure, I get it. After the Moors got kicked
out of Spain, they turned into pirates and continued their war
with the Christians that way . . . I guess . . . But what about
those Berbers? . . . Well, I better keep going.*

6. The rulers of these states also made other nations pay money, or tribute, to keep their ships free from attack.

*There's a word in italics. It's gotta be on the test. I better
look it up in the word list in the back of the book. "Tribute:
money paid by one nation to another for protection or peace."
OK, got that. Oh, I see. The Barbary States are states because
they each had a ruler. I still wonder if there was anybody like
the President of the U.S. over them. Oh well, it's probably not
important. So anyway, these rulers made other countries pay them
money to keep their ships free from attack. I see, it's like these
rulers were private policemen and they had big navies to chase
all the pirates away, and so they charged a fee for protection.
Wait a minute. It says the rulers also made the nations pay
tribute. Also what? Who else made them pay tribute? And made
them pay. How could those rulers force big European countries to
pay them money? Those countries must have been pretty chicken or
pretty scared. Maybe it was just the small countries that paid
. . . Well, maybe I'll ask later. This is taking too long to read.
And I still don't understand what the point of this is, unless those
rulers are maybe punishing the Christians some more.*

PARAGRAPH III.

7. For a time France paid tribute of this kind.

OK, new paragraph. Wow, big old France paid money to those rulers.

8. But finally the ruler of Algeria went too far.

The ruler of Algeria, where'd he come from? Oh, I almost forgot, this whole thing's supposed to be about Algeria. I think I see it now, Algeria must be one of the Barbary States. Good, finally got that out of the way. Now what is this sentence telling me? France paid tribute, but finally this ruler went too far. Too far for what? Did he leave the country and take his navy with him and so the French ships were attacked by pirates? There must be more, I'd better keep reading.

9. He struck the representative of the French government.

Oh, that kind of too far. Well he must have really belted that French guy. Or did he run him down with his horse? [Authors' note, we checked: He hit him with a flyswater.] Hey, I wonder why he hit him anyway? And how does hitting the guy make the ruler go too far? Well, maybe the next sentence will tell me.

10. In 1830 the French sent a powerful fleet, landed an army, and took possession of Algeria.

They didn't tell me why that guy got hit. But now they're telling me that the French took over Algeria. What's going on here? I better ask my teacher. . . --Oh, it's so simple now that she's explained it to me. France wanted Algeria for its natural resources, and it just used that thing the ruler of Algeria did as an excuse to take over. Sure, I understand it perfectly now. But I could have understood that ten minutes ago if they'd just told me ahead of time what they were getting at. I've had this trouble with books before. . . . But if France just used that hitting as an excuse, why did the book say the ruler of Algeria went too far?

11. In the years that followed, many French settled in Algeria.

PARAGRAPH IV.

12. Algeria was first a colony and then a division of France.

What's a division of France? I'll check back in the chapter on France. . . . Nope, it doesn't say there. But I remember that chapter well. The last question at the end of the unit was "What happened to the French colonies in Africa? What is the French Community? Why is it important to France?" Our teacher assigned that question to us back in the fall, just after these new books came in. She called on me in class to answer. I told her I couldn't find the answer. She said look at the time line chart under 1963. I looked and I said that it said Algeria wins independence from France, and she said, so what happened next, and I said I never read anything in the chapter about Algeria or the French Community and she said that I didn't read the chapter carefully enough. But then everyone else said they didn't see that stuff either and she checked and then she said she was really sorry. She said her book, that's got all the answers, had the answer to those questions, and that the answers to those questions were in the books that these new books replaced, and she just couldn't understand why they left that question in our new books. She looked kinda embarrassed and angry at the same time. Where was I? Oh yeah. Division of France. Well, maybe the next sentence will tell me.

13. Its representatives met with French lawmakers in Paris.

Let's see, Algeria sent representatives to meet with the lawmakers of France. Like how we send ambassadors to other countries, huh? But what did they meet with those lawmakers about? And they still haven't told me what a division is. Well let's try the next sentence.

14. It elected an assembly that met in Algiers.

It, what's it? Oh yeah, Algeria. So Algeria elected an assembly that, . . . no that's not right, people elect people, so it must be the people of Algeria who elected the assembly. Where's Algiers? I better check the map--yeah, that's the capital of Algeria. Wait a minute, what about that division and those French lawmakers. Well, maybe the next sentence will tell me what they're getting at.

15. But the people of Algeria felt they did not have equality with the French settlers.

Whoa, I just figured out that the people of Algeria elected an assembly. I guess that Assembly didn't have any power because the French settlers were more equal. Maybe I better ask--Gee, she says Algeria was almost a part of France, like almost a state, and its representatives even got to vote in France, and it was the French settlers who controlled the Assembly in Algiers. Why didn't they say that? It's so simple and now I see why those Algerians wanted independence.

PARAGRAPH V.

16. In 1954 the Algerians revolted against French rule.
17. After almost eight years of war Algeria finally gained independence.
Gee this is easy now.
18. It became a member of the Arab league.

Let's see, I think I remember about the Arab League. My teacher said it was some kind of organization. Maybe I'll check back in the book. The index says pages 84-85. . . . Nope, nothing there! I wonder why the index said to look there and there is nothing about the Arab League there. [Authors' note: The 1969 edition has a whole section on the Arab League.] Page 99 . . . It says President Nasser of Egypt made Egypt the leader of the Arab League. That's no help. Well anyway, it's some kind of organization. Now all I've got to do is figure out whether Algeria got independence

because it joined the Arab League, or whether it just plain joined the Arab League after it got independence. But that must not be important, because they would have told me otherwise. I think I'll forget about the Arab League. . . . Onward to the next paragraph.

PARAGRAPH VI.

19. After Algeria received independence, many people of French ancestry left.

I wonder why they did that? Maybe that Arab League made them leave, or maybe they'll tell me in the next sentence.

20. Some remained, however, because they thought of Algeria as their home. Well, they didn't exactly tell me. But I guess that the ones who left didn't think of Algeria as their home. They wanted to go home to France, I guess to be with their families. . . . Anyway, why is it important whether those people left or not? I guess they aren't going to tell me, 'cause this is the end of the paragraph.

PARAGRAPH VII. (page 499)

21. Algeria is more than three times the size of Texas.

Here we go. Lots of facts. Population, size, and probably products to come. Why don't they just make up a list for all the countries of Africa and put it in one place. Then I could just compare all the countries at once.

22. It has a population of almost seventeen million.

23. Most of the people live in the north.

Why? or is that just the way things are?

24. its capital is Algiers.

I already had to know that to understand about where the assembly met. What about the people in the north?

PARAGRAPH VIII.

25. In northern Algeria a strip of land between the Atlas mountains and the sea receives rain in winter and spring.

Is this why the people live in the north?

26. It produces abundant crops.

Oh, I see, they're telling me about climate and vegetation.

27. South of the mountains is the Sahara.

Mountains? Oh yeah, the Atlas mountains. Oh, maybe that's why the people live in the north. It's not that they like to get rained on. They just don't want to live in the desert.

PARAGRAPH IX.

28. The coast land has vineyards famous for wine and produces many vegetables.

What coast land? Is it near the Sahara? No that can't be right. Oh, the coast, like the coast of the Mediterranean. Now is this land different from that strip of land they just told me about, or is it the same? It says the strip is between the sea and the mountains. Is the coast land part of that strip or is it between the sea and that strip? Oh well.

29. A kind of grass called alfa, from which paper, rope and baskets can be made, is grown there.

There's another word I better remember.

30. This region has phosphate rock used for fertilizer.

Now, are we still talking about the coast land? Are we still talking about agriculture?

31. Eastern Algeria has iron mines.

Nope, this paragraph must be about natural resources and crops. I never heard about Eastern Algeria before. Is that a special division like the north and south divided by the Atlas Mountains, or is it just the east part of Algeria?

32. Large amounts of petroleum and gas are produced in the Sahara.

OK, I got it now. Phosphate in the north, iron in the east, gas and oil in the south. So what's in the west?

33. Along the waterfront Algiers looks like a French city, with broad streets, shops and fine buildings.

I must have missed something. Where'd this waterfront come from? What's this got to do with natural resources?

34. The old Arab city, located on the slopes above, keeps its narrow streets and Arab ways.

What old Arab city? What slopes? Does that Arab city have a name? This is the last sentence about Algeria. They aren't going to tell me what this is. Well, at least I finally got through with it. I sure hope the rest of this unit won't take so long or be so confusing.

Discussion of "Algeria, Past and Present." While it's clear that no single student would stop reading and introspect about the incoming material in every place we've just described, we believe that we have described places where a reader might stop. And we believe that in general it is a good thing for a reader to stop, question, and reflect on what is supposed to be understood--indeed, such behavior is likely indicative of good reading skills. And we also believe that a good text should to some extent challenge the reader to consider the concepts presented or to respond to the lines of argumentation laid out.

However, the text should not be set up in such a way as to hinder the reader's understanding by the presence of "text" problems of structure, unity, coherence, and audience appropriateness, all of which can create roadblocks for the reader who, presumably, is interested in getting the conceptual content from the text. In our look at the Algeria passage, our sixth grader spent much more time responding to author/editor-created confusions than to what are really the quite straightforward facts of the history and resources of Algeria.

Let us now very briefly review the problems our sixth grader had in reading the Algeria passage. In this passage, we saw three problems that the reader might have had because insufficient attention was paid to the qualities of structure and unity. An example is seen in Sentence 3, which is about the wars with the Christians. This sentence could be interpreted by the reader as providing information about the topic of the paragraph, but in fact is probably intended to be a background fact. We imagined our sixth grader puzzled about the pirates, tribute, and subsequent events with the French representative and French army. Our reader became confused because there was no topic sentence early in the second paragraph. Such an advance organizer might have aided him or her in interpreting the fact about the pirates and tribute as background information for an event of importance, namely, the French takeover. Finally, under the category of unity, we would include confusion resulting from the radical topic shift from natural resources of Algeria to the description of Algiers that occurs within a paragraph at Sentence 33.

In considering audience appropriateness, we found our reader wondering about what it meant to classify the people of Algeria as "Berbers," why the Barbary States were states, and what a "division" of France was. Also our reader wondered why the ruler of Algeria struck the French representative and why the author told about the old Arab city keeping its old Arab ways. Finally, our reader was puzzled by the relationship between the striking of the representative and the French takeover, and by the relationship between Algeria's gaining independence and its joining the Arab League.

In each of these cases, more information might have been given to make the meaning of the terms or relationships among them more explicit and thus to make the information more appropriate for an audience that knows little or nothing about Algeria before the sixth grade.

With respect to coherence, antecedent referents and facts were sometimes unclear. Our reader had difficulty interpreting the pronoun it in Sentence 14, and then, having made the most logical stab at identifying the antecedent, the reader discovered in the next sentence that the guess was incorrect, but then found no available antecedent. The connective also in Sentence 6 presupposes an antecedent fact such that Sentence 6 is parallel in some way with what has come before. But such a fact cannot be located in the text.

Some Possible Causes and Effects of Poorly Written Texts

We are not sure why bright, dedicated people are not producing better quality text for children. Nonetheless, we submit several ideas about the situation. One substantial problem for writers of children's texts compared with adult-level texts is related to an apparent paradox. The explanations offered in children's texts are necessarily simplified forms of more complex explanations. Consequently, pressure is on the authors of children's texts to (a) use short, simple sentences, (b) use easy vocabulary words, (c) omit less important details or procedures, and (d) condense the explanation of many ideas into a relatively small number of words.

Paradoxically, simplifying explanations in texts can create potential problems for readers. Several of these problems are now described. (a) When short, simple sentences are used instead of longer complex or compound ones, the meaning of the relationships which link ideas together is often made more vague. The readers are forced to infer those relationships from their own world-knowledge. (b) Using easy vocabulary words in place of less frequently used, precise words can often blur an intended meaning. (c) When details or procedures are omitted, the burden is on the student to make inferences about the meaning as suggested by the gaps. (d) Condensing ideas increases their density to the point that children may suffer from conceptual overload after reading for a short time and thus fail to process very much of the information. To reiterate, the procedures commonly used by authors in an attempt to make text easier to read may instead cause that text to be even more difficult to comprehend.

Another view places the blame more on the editors than on the authors. This criticism starts with the assumption that the textbooks currently used are most often at least several editions old. New editions never seem to start from the ground up, but instead an editorial staff reworks the previous edition. Any revision has to result in a marketable product, thereby forcing the staff to cull the outdated material, and refreshen it with current knowledge. Also, special interest groups may persuade editors to make changes related to contemporary touchy spots such as racism, sexism, religion, and politics. We suspect that when this "bandaid

approach" is used to update text over several editions, the purpose of the original author gets lost. Without a clear purpose (or purposes) to structure the flow of ideas as they are written as well as to guide the reading strategies brought to bear on the text by students who read it, not much will be learned from the text.

It is difficult to determine how students are affected by exposure to unclear text. First, the effect of poor quality text on how much content area (history, science, geography) knowledge students learn in elementary school may not be very great. The reason for this conjecture is that many teachers in elementary grades do not use textbooks as a primary learning vehicle anyway. Rather than encourage students to learn-by-reading-text, the teachers more often emphasize learning-by-doing, learning-by-discussing, learning-by-watching-movies, or learning-by-listening-to-the-teacher. We believe that the unclear quality of texts may encourage teachers to use the texts even less than they otherwise might have, for to use them would be a less efficient instructional technique than those mentioned above.

Second, the effect of poor quality text on how well children learn to read and comprehend text may be very great. Texts used in the content areas of upper elementary grades are almost always expository in form, as compared to the narrative forms that are most prevalent in the reading materials used in the primary grades. We think that the processes required to read and understand expository text are different enough from those required to read narrative text that special training and practice is required before most students can be proficient at reading expository text.

Although reading materials used in the upper elementary grades typically teach some of the skills required for reading expository prose, students with only fledgling comprehension and study skills cannot be expected to read-to-learn from unclear passages similar to those we analyzed. A few students are able to do so, but the remaining ones cannot learn-by-reading nor are they able to exercise and develop their skills. It appears to us that texts should be an adequate learning source for essentially all students and not just the top 50% (an average estimate provided by 18 teachers from one school district). The problem increases when students progress to high school and are expected to use text as primary sources of information, but cannot do so. High-school teachers typically do not instruct students in how to read their texts, although it may be a good idea for them to do so.

Another possible effect of poor-quality text may be an attitudinal one. It is possible that students will develop undesirable attitudes towards text if frustration and/or frequent intervention from teachers and parents are prerequisites to reading and learning from it. Learning from text is like many other complex tasks that students learn. If they learn to do it well and are led to believe that it is an important task, then the chances are increased that they will choose to do it again later. If they are not successful in learning a task, then it is difficult to imagine that they will want to do it again very often.

Another point, although not directly related to content area texts, is that most standardized achievement and ability tests require students

to learn-by-reading and then to answer questions about what they learned. Unlike the classroom with its teachers, discussions, and audio-visual aids, testing situations provide students with no clues to help them with the task of learning from text other than what is on the printed page and what is already in their heads. We suspect that more children would score higher on those tests if they were trained better in the learn-by-reading skills.

Recommendations

1. Publishers need to implement a more systematic monitoring process than is now being used. Of course, the ideal monitoring system would require students with a cross-section of abilities and interests from the target population to read the text before publication and demonstrate that they can indeed learn the important ideas by doing so. Unfortunately, this suggestion would be costly to implement and may cause publishers to develop a product that would not resemble the mainline textbook, thus adversely affecting its sales, initially. However, one can hope that a clear, albeit different, type of text would soon dominate the sales market.

2. Another suggestion to publishers and editors is that an editorial advisory board be established whose responsibility would be to evaluate the "learnability" of text. People on this board (including instructional specialists, content area specialists, discourse analysts, and teachers) would simulate students as they try to learn by reading, perhaps by bringing to bear perspectives and analytical techniques similar to the

ones illustrated in this paper. Often, students would be asked to read texts for the group to give them evidence that would help validate the group's procedures and/or conclusions. This editorial board would advise authors about text quality before publication.

3. Our recommendation to authors is so unimaginative that we do it with a few mild, unspecified, apologies. Our recommendation is that absolutely no other writing criteria supersede the four we discussed earlier in this report, i.e., structure, coherence, unity, and audience appropriateness. After authors are convinced that the texts they produce meet these criteria, other criteria can be applied to assure that the text is interesting and aesthetically pleasing to the readers.

Authors must keep in mind that many times when a good-quality text is adapted downward, that is, rewritten in a simpler version, certain meanings and qualities present in the original text are sacrificed. The point we are trying to make is that structure, coherence, unity, and audience appropriateness must be preserved, even at the expense of adjusting less important criteria. In the process of meeting these criteria some ideas may become complicated enough that it is impossible to explain them well in children's text, or be so comprehensive that the limited space in children's books precludes including them. The Algeria passage in the social studies text illustrates the type of text that results when comprehensiveness is given a higher premium than comprehension.

4. Teachers need to be made aware of these variations in text quality. Our experience has shown that teachers select textbooks for a variety of

good reasons, but often the factors of "learnability" and "clarity" are overlooked. In our field work with teachers, we encourage them to analyze text as we did in this report. They are often amazed at their discoveries and embarrassed at having selected such textbooks. We suggest that before teachers adopt a new textbook, some text excerpts from the candidates for text selection be administered in a reading-to-learn mode to a sample of the target students. Whether students can read and learn important ideas from the text should become an important factor in deciding whether or not to adopt a specific textbook. Perhaps teachers have the greatest potential to change the system by exercising selectively their "buy or not buy" prerogative.

5. Finally, under conditions in which teachers have no other option than to use less-than-adequate text, we make two recommendations.

(a) Continue to struggle and use the text with students. Beware that it does not become shuffled off to a corner of the classroom bookshelf and forgotten.

(b) Work hard to teach the students how to deal with the less-than-adequate text, but not by actually teaching them the content and thus obviating the need or desire to read. This means that you may need to help clarify for the students before they read the text: (a) the purpose for reading, (b) the required background knowledge, and (c) the sections of text made confusing by problems of structure, coherence, unity, and appropriateness.

A concluding thought--

When students are curious about knowledge:

Teach it, and it's soon forgotten.

Teach them to read it, and it's available for a lifetime.

References

- The American College Dictionary (C. L. Barnhart, Ed.). New York: Random House, 1964.
- Bendick, J., & Gallant, R. Elementary science 6. Lexington, Mass.: Ginn, 1980.
- Lefferts, W., & Soifer, I. The old world (Teacher's Edition). New York: Macmillan, 1978.

Table 1

Outline of Unit Subtitles and Major Ideas in "Food for the World"

<u>Subtitles</u>	<u>Pages</u>	<u>Major Ideas</u>
I. Plants are Important	48-49	Green plants produce food for the world. Most of this food is produced in the leaves of green plants as a kind of sugar. Plants also use food.
II. Kinds of Leaves	50-51	There are many different kinds of leaves.
A. How Leaves are Alike and Different	52-54	
III. Plants that "Eat" Animals	55-59	
IV. How Leaves Make Sugar	60-62	
A. A Look Inside a Leaf	63	
V. How Green Plants Get Energy	64-66	Leaves use the energy of light, plus carbon dioxide and water, to produce sugar in a process called photosynthesis.
VI. How Green Plants Use Their Energy	67-68	In respiration oxygen is combined with sugar to produce energy. Leaves lose moisture in a process called transpiration.
A. Setting the Pace of Photosynthesis	68	
B. How Leaves Save Water	69-73	
C. The Pace of Transpiration	74-76	

(continued)

Table 1 (continued)

<u>Subtitles</u>	<u>Pages</u>	<u>Major Ideas</u>
VII. How Leaves Change Color	77-81	Some leaves change color and fall from the plants during the autumn season.
A. What Makes Leaves Fall?	82	
VIII. Plants to Feed the World	83-86	Food (and energy) is not evenly distributed throughout the world.
A. Plants Have Helped Us	87	Increasing world population may surpass the ability of the green plants in our environment to support life.
B. Who Can Feed the World?	88-90	We can help keep our environment in balance.
C. What Happens Next?	91	

Table 2

Target Segment from "How Leaves Save Water"

- I ¹ In most green plants that grow on land, the guard cells close the openings in the evening and keep them closed all night. ² Then, in the morning, they open and stay open all day. ³ We know that photosynthesis goes on during the day but not at night. ⁴ So we might think that the opening and closing is in some way linked with photosynthesis. ⁵ But is it?
- II ⁶ Photosynthesis in the leaves starts with the morning sunlight. ⁷ Carbon dioxide was made during respiration all night. ⁸ It was stored in the air spaces around the spongy cells. ⁹ This carbon dioxide is used as the leaf starts to make sugar. ¹⁰ When a certain amount has been used up, the guard cells respond. ¹¹ They become stiff, swell out, and make openings in the leaf. ¹² They stay open all day.
- III ¹³ In the evening, the light fades. ¹⁴ Photosynthesis slows down. ¹⁵ But respiration goes on. ¹⁶ The amount of carbon dioxide in the air spaces builds up again. ¹⁷ This buildup of carbon dioxide makes the guard cells relax. ¹⁸ The openings are closed.
- IV ¹⁹ The amount of water in the plant also affects the motions of guard cells. ²⁰ All the time the guard cells are open, the leaves lose water to the air. ²¹ On a hot, dry day a plant may lose more water through transpiration than it takes up through its roots. ²² If it does, its leaves wilt. ²³ They go limp and droop. ²⁴ This is a sign that the cells of the leaves do not have enough water to keep the leaves stiff.

(continued)

Table 2 (continued)

- V ²⁵ As the guard cells begin to go limp, they close the leaf openings.
²⁶ This prevents the leaves from losing more water. ²⁷ The stomata stay closed until the water supply in the leaf cells is built up again by the roots. ²⁸ This may take a few hours or a few days. ²⁹ Or, in time of drought, it may take a few weeks.
- VI ³⁰ While the stomata stay closed, photosynthesis goes on at only a slow pace. ³¹ The pace may be so slow that the leaves are not able to make as much sugar as the plant needs. ³² If that happens, the plant must use some of its stored food. ³³ And if the stored food becomes used up, the plant dies.
- VII ³⁴ Regulating water loss, then, is the chief role played by the stomata. ³⁵ If their main job were to speed up or slow down photosynthesis, there would not be a need for the guard cells to close at night. ³⁶ But in most green land plants, the guard cells do close the stomata at night.
³⁷ It is the leaf's way of saving water.
- VIII ³⁸ Some plants have stomata only on the under surface of the leaf.
³⁹ Although most green land plants have some on the top surface, there are more on the bottom surface. ⁴⁰ Why do you suppose that the bottom surface is the best place for the stomata to be?

Table 3

The Old World Table of Contents

Unit 1	Our Earth, 1
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Table 4

Unit 17 Table of Contents

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 1. The Exploration and Settlement of Africa
 - A. The Exploration of Africa
 - (i) Explorers in Central Africa
 - (ii) Explorers in Southern Africa
 - B. European Nations in Africa
 - C. Africa After the World Wars
 - (i) Changes after World War I
 - (ii) World War II in Africa
 2. The Regions and Countries of North Africa
 - A. The geography of North Africa
 - B. The nations of North Africa
 - (i) Morocco, a Mountainous Land
 - (ii) Algeria, Past and Present
 - (iii) Tunisia
 - (iv) Libya, a Desert Island
 - C. Changing North Africa
 3. The Countries and Regions of Central Africa
 - A. The Geography of Central Africa
 - (i) Climate and Vegetation
 - (ii) Rivers, Lakes, and Waterfalls
 - B. Early History of Central Africa
 - (i) Coming of the Arabs
 - (ii) The Kingdom of Ghana
 - (iii) The Kingdom of Mali
 - (iv) Songhay and Timbuktu
 - C. The People of Central Africa
 - (i) Languages and Religions
 - (ii) Farming in Central Africa
 - (iii) The Need for Trade
 - D. Nations of West Central Africa
 - (i) The Republic of Senegal (incl. Dakar --Africa's Modern International Seaport)
 - (ii) Gambia, Smallest African Republic
 - (iii) Liberia, Oldest African Republic
 - (iv) The Republic of Ghana
 - (v) Nigeria, Republic on the Niger
 - E. Nations of Northeast Africa
 - (i) Ethiopia
 - (ii) The Republic of Sudan
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Table 4 (continued)

- F. The Nations of South Central Africa
 - (i) History of the Zaire (Congo) River Area
 - (ii) Zaire
 - (iii) The Congo Republic
 - (iv) Rwanda and Burundi
 - (v) Tanzania, Uganda, and Kenya
 - (vi) Malawi and Zambia
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- 4. The Countries and Regions of Southern Africa
 - A. The Geography of Southern Africa
 - B. Madagascar
 - C. The Republic of South Africa
 - (i) The Settlement of South Africa
 - (ii) The Government of South Africa
 - (iii) Johannesburg, a Gold-Mining Center
 - (iv) Kimberley and its Diamonds
 - (v) The Products of South Africa
 - (vi) A Great National Park
- 5. The Future of Africa
 - A. The Needs of Africa
 - B. Reasons for Hope

Table 5

List of Major Understandings from Teacher's Edition

Major Understandings Which Should Emerge

Africa, the second largest continent, has many different natural regions and vast natural resources, most of which are still underdeveloped.

*North Africa has a Mediterranean climate which makes living conditions pleasant in regions near the sea. It extends southward through the Sahara, the world's greatest desert.

Central Africa, which lies in the tropics includes vast grassland areas and a wide belt of forests near the equator.

South Africa, in a temperate region, has a pleasant climate and is rich in resources.

The history of Africa is interesting and varied.

Ancient Egypt, in northeastern Africa, was one of the cradles of civilization.

Ethiopia has been an independent nation since ancient times.

There were important kingdoms in Central Africa hundreds of years ago.

Central and southern Africa remained virtually unknown to Europeans and Americans until the nineteenth century.

After 1870 most of Africa was taken over by seven European nations.

Two world wars brought great changes: Germany lost its African colonies after World War I; Italy lost its African colonies after World War II.

In 1961 the Union of South Africa withdrew from the Commonwealth of Nations and became the Republic of South Africa.

Since World War II, most African countries have gained their independence.

These new and developing nations face the same basic problems: to set up stable governments; to conquer disease; to overcome illiteracy; and to develop their natural resources.

The new nations of Africa have formed associations with organizations in other parts of the world: some have chosen to belong to the Commonwealth of Nations; some have joined the French Community; all have become members of the United Nations.

Skills to be Stressed

Further practice in using maps for orientation and information

*Ability to recognize cause and effect, especially the effect of climate on the people of a region

Using pictures as sources of information and as one basis for drawing conclusions

(continued)

Table 5 (continued)

Attitudes for Special Emphasis

- *Appreciation of the contributions of North African peoples to early civilization
- *Recognition of the problems and opportunities that face the new nations of Africa
- Interest in the development of Africa.

Table 6

Target Segment "Algeria, past and present"

- I ¹ Algeria is a Mediterranean land. ² Most of the people of Algeria are Berbers.
- II ³ In early times the people of North Africa were often at war with the Christians on the other side of the Mediterranean Sea. ⁴ The North African lands were known as the Barbary States. ⁵ In the 1700's and early 1800's the Barbary States were the home of pirates who seized ships, kept the cargoes, and sold the passengers and crews as slaves. ⁶ The rulers of these states also made other nations pay money, or tribute, to keep their ships free from attack.
- III ⁷ For a time France paid tribute of this kind. ⁸ But finally the ruler of Algeria went too far. ⁹ He struck the representative of the French government. ¹⁰ In 1830 the French sent a powerful fleet, landed an army, and took possession of Algeria. ¹¹ In the years that followed many French settled in Algeria.
- IV ¹² Algeria was first a colony, then a division of France. ¹³ Its representatives met with French lawmakers in Paris. ¹⁴ It elected an assembly that met in Algiers. ¹⁵ But the people of Algeria felt they did not have equality with the French settlers.
- V ¹⁶ In 1954 the Algerians revolted against French rule. ¹⁷ After almost eight years of war Algeria finally gained independence. ¹⁸ It became a member of the Arab League.

(continued)

Table 6 (continued)

- VI ¹⁹ After Algeria received independence, many people of French ancestry left. ²⁰ Some remained, however, because they thought of Algeria as their home.
- VII ²¹ Algeria is more than three times the size of Texas. ²² It has a population of almost seventeen million. ²³ Most of the people live in the north. ²⁴ Its capital is Algiers.
- VIII ²⁵ In northern Algeria a strip of land between the Atlas Mountains and the sea receives rain in winter and spring. ²⁶ It produces abundant crops. ²⁷ South of the mountains is the Sahara.
- IX ²⁸ The coast land has vineyards famous for wine and produces many vegetables. ²⁹ A kind of grass called alfa, from which paper, rope and baskets can be made, is grown there. ³⁰ This region has phosphate rock used for fertilizer. ³¹ Eastern Algeria has iron mines. ³² Large amounts of petroleum and gas are produced in the Sahara. ³³ Along the waterfront Algiers looks like a French city, with broad streets, shops, and fine buildings. ³⁴ The old Arab city, located on the slopes above, keeps its narrow streets and Arab ways.

Response From Ginn and Company

Thank you for the opportunity to respond to the manuscript, "How Clearly Written are Children's Textbooks? Or, Of Bladderworts and Alfa." Assembling a response has been difficult because of the large number of questionable premises found in the manuscript. That is not to suggest that gifted writers should not be challenged. (Isaac Asimov, author of the criticized passage, is certainly in the gifted category.) But if a scholarly criticism is attempted, then some concern should be shown for educational research conventions. The text of our response will be limited to citing some of the fallacies in the manuscript. We can neither agree nor disagree with the opinions of the critics since evidence to support their conclusions is lacking.

Our decision to include the material in a textbook was based on student achievement in field test situations and teacher input from both trial and adoption use in classrooms. Feedback indicated that the material in question yielded favorable test results in the real world. The following items summarize our objections to the article:

1. "...Taking the perspective of a sixth-grade reader, we looked at the text from the point of view of a rhetoric critic." This assumption is used throughout the manuscript. We question the acceptability of an adult mind imputing sophisticated procedures of rhetoric to a child's mind. If, as some researchers have suggested, eleven-year-olds are at the concrete operational stage, then formal operational rhetoric standards could not apply. The analysis procedures used, therefore, would be invalid. If the base premise is invalid, then the value of the entire work should be questioned.
2. Only dialectic arguments are posed. Since the critics have suggested the characteristics to be used in judgment, then applied same, no objective refutation is possible. This approach is not uncommon in education, usually being used for lay audience targets. Since the intended audience of the article submitted for my review will be practitioners, it would have been preferable for the author to use

empirical data. Then assessment of hypothesis, analysis method, controls, and results could be rigorously tested and judged. Since only semantic judgments are used, assessment becomes purely argumentative. It is true, however, that someone may attempt an empirical study after reading the critique. If that be the case, then the article may have some value as a heuristic.

3. The critics have imputed objectives not intended by the text authors. The statements "Presumably the authors real purpose is..." and "...the author's purpose as implied by the title of the subsection" overlook the role of performance objectives in educational material. The objectives as stated on p. 69 of the Annotated Teacher's Edition are:

1. CONSTRUCT an experiment to find out how much water is lost through transpiration by plants under varying conditions.
2. DESCRIBE stomata as being regulated by guard cells, and as acting as leaf openings for gases.

It is these objectives that are taught and measured, not some other objectives put forth by the critics. If the critics disagree with the program objectives, then that is food for another article, not one purportedly devoted to clarity of writing.

4. The critics' rationale for choosing the sample to be subjected to detailed analysis is questionable. Teachers customarily use a lesson approach as a way of subdividing larger units. Yet sample chosen came from the middle of a lesson. If anything short of a lesson is taught, then teachers would likely start at the top of a page, or at least at a headline or photo break. The sample starts with the second paragraph down, two pages from the start of the lesson. This concern could be ascribed to simple carelessness. If, however, the choice was the result of a deliberate attempt to put the material in its worst light, then serious questions of research objectivity arise.

5. Of great concern to all who are interested in science education is the critics' total disregard for an important goal that has been

sought during the last twenty years--the inquiry process. Straight expository writing is common to encyclopedias: Declare the topic in a headline; list the components or features of the concept; declare the conclusion; move on to the next topic. It was just such writing (and teaching) that resulted in the injection of funds by the National Science Foundation and other groups into program development. The thrust of most new curriculum developments could be summarized by words missing from the article--inquiry and critical thinking.

Focusing on inquiry means that text material and activities should make the processes of science come through. Writing techniques that sometimes focus on trivial detail, list contradictory facts, present discrepant events, or allow gaps in text matter that can be supplied by hands-on involvement are all used to yield cognitive growth in the processes or intellectual skills of science.

The writing style employed in the sample selected does just that. Elements perceived by the critics as "coherence...the reader...is likely to read the piece as an integrated whole..." could be viewed as defeating inquiry. If the intent is really to have the reader perform some integrative thinking, then a gap that encourages consideration of the outcome of a previous or upcoming activity is vital. Suffice it to say that inquiry-based instruction delivered in a narrative style is unlike the critics' ideal of "flawless models of deductive reasoning and logical argumentation." It would be interesting to see what the critics would recommend as a "flawless model" in science.

6. Another concern to be addressed is the terminology employed by the critics. "Audience appropriateness" is a term used in the critique. The target audience of the critique is composed of classroom practitioners, administrators, and educational researchers. Use of phrases such as "these passages are not the 'dogs' of our search" leads readers to infer that much worse can be found. Again to be objective, this may or may not be true. However, such unsubstantiated claims cannot be tossed off in a serious article.

Other value-laden or non-specific terms are used: get the picture; Aha! experience; wading through; myriad of ideas; kaleidoscopic presentation; watered down. This kind of terminology does not belong in a research paper. Restraint and caution are hallmarks of good research. These attributes are not employed by the critics.

7. Another test of reasonableness expected by an audience of educators is the source of logic for the valuing statements applied. Yet no references are included. No citing of works by the experts in the field. With such references, a reader could check source statements to determine applicability to the instance cited. The only source cited is one used to verify a definition of the word "lose." Unfortunately the source, (The American College Dictionary, 1964), is not one typically used in classrooms. A better source would have been an intermediate, junior or advanced junior dictionary where the appropriate definition is found.

8. In addition to the aforementioned concerns regarding the scholarly enterprise involved in producing the critique, a response to the "... Causes and Effects of Poorly Written Texts" is in order. The section begins, "We are not sure why bright, dedicated people are not producing better quality texts for children." A tongue-in-cheek reply would suggest: "Because all of the bright, dedicated people are critics." Other reasons, however, might include the fact that bright, dedicated people are involved but the job is a lot tougher than it looks to the critics. Or, perhaps text material isn't really as bad as the critics have suggested, and in fact, is better than might be expected of material that must meet a variety of standards and work in a variety of situations.

The "Causes and Effects" section goes on to suggest that perhaps blame should be put on the editors. Interestingly, "blame" is assigned even though no hard evidence was shown that culpable fault exists. Familiarity with the publishing enterprise would suggest that editors can sometimes improve author material.

The suggestion that new editions are of themselves bad, contradicts efforts by groups encouraging learner verification and resultant revision as a way to evolve improved instructional materials.

The last part of "...Cause and Effects" gets at the real problem. The critics finally admit that "It is difficult to determine how students are affected by exposure to unclear text." This must be settled first, before making any judgments as to cause and effect. One way this can be done is as follows:

- A. Enlist two groups of learners with equivalent background.
- B. Use appropriate analyses to determine equivalency of background.
- C. Administer a pre-test.
- D. Deliver instruction to the control group with conventional "poor quality" text material.
- E. Deliver instruction to the treatment group with material developed by the "bright, dedicated" people. (Where did they all go?)
- F. Administer a post-test.
- G. Perform an analysis of variance for end of instruction achievement.
- H. Report results in bias-free language. Describe methods used so that the study can be replicated.

The above should sound familiar to anyone who has taken a "Tests and Measurements" course.

9. Finally, the critics have compiled a list of five recommendations. The first recommendation suggests a field test as an ideal monitoring system. The recommendation concludes that publishers would never do that because of costs and a resultant product that would not sell. While this criticism may have been true twenty years ago, it is not true today. All major publishers field test their material. Supporting documents are required to be submitted before many adoption agencies (Florida, California, Texas, etc.).

The second recommendation suggests editorial advisory boards to evaluate "learnability" of text material. This is another idea that has been in use for decades. Look in the front matter of most teachers editions for details. (Both field testing and advisory panels were used for the criticized work.)

The third recommendation was made with apologies to prospective authors: "Our recommendation is that absolutely no other writing criteria supersede the form we discussed earlier in this report." And this is to be accepted based only on the views of "rhetoric" critics? Only a value-laden term can describe that recommendation: ABSURD.

Recommendation number four advises teachers to use the critics' method in evaluating textbooks before purchase. Teachers would probably welcome assistance in applying standards for selection of textbooks, but what is the distinction between the critics' imposed standards and those of other "special interest groups" cited in the cause and effect section?

The final recommendation advises teachers who must, to "struggle" along with "less-than-adequate" texts. Unfortunately, and again because of the lack of objective data, the critics would be surprised by the fact that what is perceived to be "less-than-adequate" may be outstanding in the hands of some teachers. And therein lies the main element missing from the critique. Learning does not go on in a vacuum with only a student and her/his textbook. A large group of factors have been shown to influence learning. These include but are not limited to: teacher preparation, learners' previous experience, physical conditions, peer influence, home and family, etc. Way down on the list would be the efficacy of the textbook. And even then the studies are generally concerned with readability factors unrelated to those used in the critique. In fact, the critics have suggested (first and second paragraphs, "Some Possible Causes and Effects...") that readability scaling techniques are not important.

In closing, let me suggest that the authors take seriously the earlier suggestion of a rigorous experimental design. If there is anything I can do to help, please do not hesitate to call.

Michael J. Kane
Senior Editor
Science Publications

Editor's Note

The Reading Education Report Series is not intended to be a formal publication but is an outlet through which scientists at the Center for the Study of Reading (CSR) might share their intuitions, insights, and research findings that are of relevance to educators. To avoid any suggestion that there is a single doctrine to which scientists at CSR collectively subscribe, we have adopted a policy by which the ideas of any single scientist or group of scientists might be balanced or criticized. The present report How Clearly Written Are Children's Textbooks? and the invited response of Michael Kane, Senior Editor, Ginn and Company, represent an attempt to avoid any such indoctrination and instead, create a forum for discussion as well as stimulate reflection. Together, the paper and Kane's response are intended to raise issues of relevance to teachers, publishers, and scientists interested in school text material.

If it can be argued that knowledge is knowing just what it is you do and do not know, it should not be surprising that the report by Anderson, Armbruster, and Kantor and the response by Kane concur that we do not really know how clearly children's textbooks are written. The controversial issue seems to be how to assess clarity. Anderson, Armbruster, and Kantor lean toward intuitions based upon a subjective criteria derived from a rhetoric perspective; Kane appeals for the application of a classical experimental tradition which may require controls and text manipulations beyond which students ordinarily encounter. Unfortunately, neither party addresses the

questions: Who should perform these classical experimental studies? Should it be the publishers, researchers, or a collaborative team? Nor do they fully address: What might be regarded as evidence for or against the use of certain texts with certain features?

The adamancy with which both parties represent certain perspectives might suggest that an adversary relationship exists between these scientists and this publisher. I disagree. Both parties are obviously interested in the improvement of textbook material. I would venture to suggest, however, that the present parties must acknowledge each other's contribution and should assume joint responsibilities. For example, I believe Kane should recognize the worth of the intuitive analyses pursued by Anderson, Armbruster, and Kantor. Their intuitions serve an important role in generating hypotheses for further and more detailed text examinations. Similarly, Anderson, Armbruster, and Kantor must recognize the insights a publisher can offer with regards to curriculum and classroom uses of text material. To these ends, joint research programs, the establishment of joint advisory groups and further dialogue seem essential.

As a classroom teacher, researcher, and author, I am encouraged by the present dialogue. I believe publisher's need to be open to having their text criticized; scientists should be willing to subject their criticisms to a publisher's scrutiny. As editor of the present Reading Education Report, I thank both parties for their contributions to the present deliberations. Especially, I thank Ginn and Company for their willingness to enter into this dialogue. Their interest in and support for the improvement of textbook material by research and development is admirable.

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READING EDUCATION REPORTS

- No. 1: Durkin, D. *Comprehension Instruction—Where are You?*, October 1977. (ERIC Document Reproduction Service No. ED 146 566, 14p., PC-\$1.82, MF-\$83)
- No. 2: Asher, S. R. *Sex Differences in Reading Achievement*, October 1977. (ERIC Document Reproduction Service No. ED 145 567, 30p., PC-\$3.32, MF-\$83)
- No. 3: Adams, M. J., Anderson, R. C., & Durkin, D. *Beginning Reading: Theory and Practice*, November 1977. (ERIC Document Reproduction Service No. ED 151 722, 15p., PC-\$1.82, MF-\$83)
- No. 4: Jenkins, J. R., & Pany, D. *Teaching Reading Comprehension in the Middle Grades*, January 1978. (ERIC Document Reproduction Service No. ED 151 756, 36p., PC-\$3.32, MF-\$83)
- No. 5: Bruce, B. *What Makes a Good Story?*, June 1978. (ERIC Document Reproduction Service No. ED 158 222, 16p., PC-\$1.82, MF-\$83)
- No. 6: Anderson, T. H. *Another Look at the Self-Questioning Study Technique*, September 1978. (ERIC Document Reproduction Service No. ED 163 441, 19p., PC-\$1.82, MF-\$83)
- No. 7: Pearson, P. D., & Kamil, M. L. *Basic Processes and Instructional Practices in Teaching Reading*, December 1978. (ERIC Document Reproduction Service No. ED 165 118, 29p., PC-\$3.32, MF-\$83)
- No. 8: Collins, A., & Haviland, S. E. *Children's Reading Problems*, June 1979. (ERIC Document Reproduction Service No. ED 172 188, 19p., PC-\$1.82, MF-\$83)
- No. 9: Schallert, D. L., & Kleiman, G. M. *Some Reasons Why Teachers are Easier to Understand than Textbooks*, June 1979. (ERIC Document Reproduction Service No. ED 172 189, 17p., PC-\$1.82, MF-\$83)
- No. 10: Baker, L. *Do I Understand or Do I not Understand: That is the Question*, July 1979. (ERIC Document Reproduction Service No. ED 174 948, 27p., PC-\$3.32, MF-\$83)
- No. 11: Anderson, R. C., & Freebody, P. *Vocabulary Knowledge and Reading*, August 1979. (ERIC Document Reproduction Service No. ED 177 470, 52p., PC-\$4.82, MF-\$83)
- No. 12: Joag-dev, C., & Steffensen, M. S. *Studies of the Bicultural Reader: Implications for Teachers and Librarians*, January 1980. (ERIC Document Reproduction Service No. ED 181 430, 28p., PC-\$3.32, MF-\$83)
- No. 13: Adams, M., & Bruce, B. *Background Knowledge and Reading Comprehension*, January 1980. (ERIC Document Reproduction Service No. ED 181 431, 48p., PC-\$3.32, MF-\$83)
- No. 14: Rubin, A. *Making Stories, Making Sense* (includes a response by T. Raphael and J. LaZansky), January 1980. (ERIC Document Reproduction Service No. ED 181 432, 42p., PC-\$3.32, MF-\$83)
- No. 15: Tierney, R. J., & LaZansky, J. *The Rights and Responsibilities of Readers and Writers: A Contractual Agreement* (includes responses by R. N. Kantor and B. B. Armbruster), January 1980. (ERIC Document Reproduction Service No. ED 181 447, 32p., PC-\$3.32, MF-\$83)
- No. 16: Anderson, T. H., Armbruster, B. B., & Kantor, R. N. *How Clearly Written are Children's Textbooks? Or, Of Bladderworts and Alfa* (includes a response by M. Kane, Senior Editor, Ginn and Company), August 1980.